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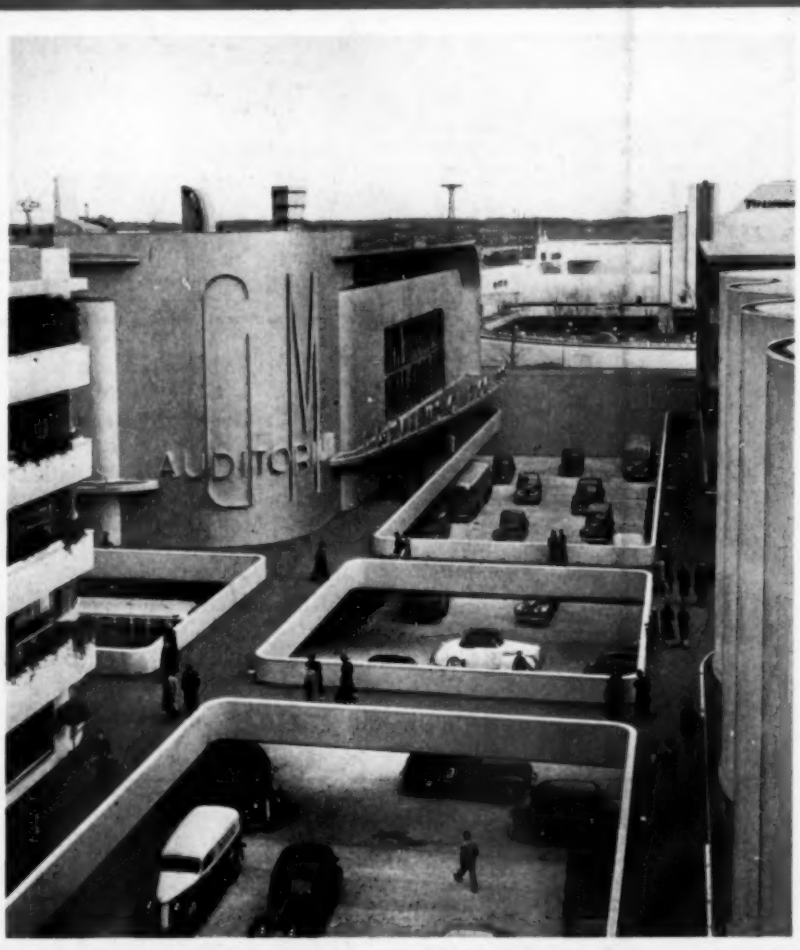
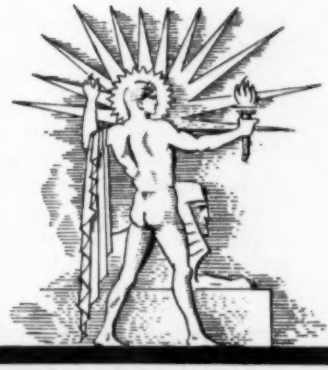
JUN 17 1939

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





June 17, 1939

Street of Tomorrow

See page 374

A SCIENCE SERVICE PUBLICATION

Do You Know?

Eggs round as billiard balls are laid by owls.

There are more than 35,000,000 Arabs in the Near East, according to one estimate.

Cottonwood trees have been known to shoot up to 100 feet in height in 15 years.

Fur-bearing animals are probably more numerous in Alaska than in any other state or possession of the United States, says the U. S. Biological Survey.

A snowman keeping quite cool over a furnace blazing at 800 degrees is an exhibit at the New York World's Fair, to show how asbestos insulates.

Some of the physical features which today are considered Jewish are traced to "Aryan" Hittites, Tartars, and Slavs with whom Jews married long ago, says a British lecturer.

Mosquitoes, tsetse flies, and other insects of Zululand, South Africa, will be collected by Dr. Florence Frost, University of California entomologist, while studying native health methods in that region.

To prevent books from mildewing in humid weather, the U. S. Bureau of Chemistry and Soils suggests placing one or more half-filled cans of lump lime on shelves behind books; with the added warning that the lime expands when absorbing moisture and may overflow a can filled beyond the half-way point.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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BOTANY

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ENGINEERING

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ENTOMOLOGY

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MEDICINE

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What vitamin may overcome food allergies? p. 382.

PHYSIOLOGY—MEDICINE

How can your tongue save your life? p. 371.

PUBLIC HEALTH

Why is an infantile paralysis epidemic considered unlikely this summer? p. 377.

Ancient Rome drafted soldiers to fight locusts three times a year in Cyrene, North Africa.

Pigeons carried messages for the ancient Assyrians, and homing pigeons are still relied upon in warfare to supplement modern communication equipment.

Effectiveness of sulfanilamide in treating certain eye diseases is attributed by one physician to the fact that the drug penetrates the eye tissues and fluids 15 minutes after being taken by mouth.

A big tree may have half a million leaves.

Polo has a long history in Persia, and a Persian Queen of the sixth century led a team of ladies.

In New York City, 66,800 individuals are being X-rayed within three weeks in a drive to check up on tuberculosis.

Indians in New Mexico saw their first horses about 1540; it was about a century and a half later before Plains Indians encountered a horse.

SCIENCE NEWS LETTER

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PHYSIOLOGY—MEDICINE

Rats' Tasting Abilities Show Life-Saving Function of Tongue

Psychiatrists Are Told That Taste May Point to Dietary Needs; Fatal Brain Ailment Described

YOUR tongue saves your life, Dr. Curt P. Richter of the Johns Hopkins Hospital told the American Neurological Association as the result of tasting tests.

Not only can it save you from swallowing poisons, but the tongue and its taste buds can guide your selection of foods so that you will get all the life-essential elements of diet, from salt to vitamins.

"The tongue is the watchdog of the diet," Dr. Richter said, "but dietitians and doctors have largely neglected it in their consideration of human diets."

The tragic story of a three-year-old baby girl whose craving for salt was not recognized as a vital demand of her body until too late to save her life was a dramatic example of the importance of the tongue as a guide to diet that occurred coincidently with Dr. Richter's innumerable tests of rats' tasting abilities which were the actual basis of his report.

The little girl was brought to Johns Hopkins Hospital from Florida to find why she was growing up too fast, with precocious sexual development. While in the hospital she was given the dietetically correct food for her age. After her death, it was found that a tumor of the adrenal glands was responsible for the sexual precocity. More than this, it had crowded out the vital outer part of these glands, causing a condition like that in once-fatal Addison's disease.

In this condition, large amounts of salt are lost from the body and must be made up in the diet. Because the condition had not been recognized before her death, the child was not given any extra salt. But afterwards her mother reported that the child had for a long time craved salt, eating it by the handful, as most children like to eat sugar.

This same condition in rats helped Dr. Richter to discover the vital importance of the tongue and its taste buds. Rats, he has found, can tell the sweetness, sourness, saltiness and many other flavors of foods or drinks. They tell it by taste.

This was proved when the animals lost their tasting ability after all nerve connections were cut between the taste buds of the tongue and the brain centers. So long as some of the nerve connections remained the animals could detect different tastes.

The rats that had no adrenal glands, for example, could detect salt well enough to save themselves from death by drinking all the salt water they needed. When all the nerves were cut, however, taste was completely destroyed. The animals drank indifferently from either salted or unsalted water supplies. They thus failed to get enough salt and died.

Taste guides the animals not only to enough salt. Normal rats, relying on taste alone, can select as good a diet for themselves, with the necessary amounts of fat, sugars and starches, proteins, minerals and vitamins, as scientists with all their knowledge can provide. Dr. Richter discovered this when he supplied the animals with a wide variety of food substances and let the animals help themselves.

When he gave them a diet lacking in any essential, vitamin B, for example, and supplied this in a tube of water identical with the drinking water tube, the animals invariably drank enough of the vitamin B water, although the only way they could tell it was by the taste.

Science News Letter, June 17, 1939

Fatal Brain Ailment

DISCOVERY of a new and fatal convulsive ailment of babies, caused by a germ that attacks the infant's brain, probably before birth, was announced by Drs. Abner Wolf, David Cowen and Beryl H. Page, of the College of Physicians and Surgeons, Columbia University.

Five cases of the new ailment have been recorded. It has been given the jaw-breaking name of toxoplasmic encephalomyelitis, to show that it is a brain and nervous tissue ailment caused by a toxoplasma. This is a rather large germ which has (*Turn to Page 382*)

HOW THEY LOOK

Here is the tick before and after gorging on a dog. Be careful how you remove this pest from your pet. It may be infected.

MEDICINE

Rocky Mountain Fever Is Vacation Time Ailment

ONE of the most serious of the dangers that threaten the vacationist, especially the one who goes on camping and hiking trips into the country, is Rocky Mountain spotted fever.

The disease is caused by the bite of an infected tick. The common dog tick and the wood tick carry the germs.

Rocky Mountain spotted fever had the reputation some years ago of killing 85 or 90 out of every 100 persons who got the sickness. More recent reports to the U. S. Public Health Service put the rate at about 18 or 20 deaths for every 100 cases.

This serious sickness got its name because it was first discovered in the Rocky Mountain area, specifically in the Bitter Root Valley in Montana, and was for a long time believed to be limited to that area. It has gradually spread throughout the country, and cases have now been reported from 31 of the 48 states, including the District of Columbia. It is most prevalent in the Pacific and Mountain states and the South Atlantic states.

The disease starts, from 2 to 14 days after the virus or germ has entered the body, with a chill, headache, sweating, and pain in the abdomen, bones and muscles. Other symptoms are the mottled rash and the fever.

A vaccine which protects against the disease has been developed and is prepared in large quantities each year by the U. S. Public Health Service. So far, the disease has not been sufficiently prevalent in the East to warrant widespread use of the vaccine, but it has been used in the West to protect sheepherders, foresters and others whose work takes them into infested regions.

For those who may only occasionally be exposed to the disease, protection against it depends chiefly on special vigilance against ticks.

Remove Them Soon

Infected ticks do not usually transmit the infection until from two to eight hours after they attach themselves to the body, so if you are alert to watch for and remove them, you may save yourself from the ailment. Use a tweezers or piece of paper, not the bare fingers, to remove the ticks, because you can get the disease from handling crushed infected ticks.

If possible, stay out of tick infested areas, health authorities advise. If you must go into such regions, wear high leather boots or socks outside of trousers (women as well as men) to keep the ticks from getting a foothold and crawling up the clothing to the neck or arms. Inspect the bodies and clothing of yourself and your children at least twice daily, if you are in tick infested areas.

Do not depend on feeling the tick crawling on you, health officers warn. Ticks are especially apt to fasten themselves on the back of the neck and along the hairline. In some cases they have even been found in the ear canal.

Derris for Dogs

Pet dogs should also be inspected for ticks. Derris, used either as a powder or a wash is effective in destroying ticks already attached to dogs, U. S. Department of Agriculture scientists have found. The powder should be used every two or three days, the wash or dip every five or six days. The derris powder should have a rotenone content of at least two per cent. An effective wash can be made by dissolving an ounce of soap in a gallon of water and adding two to four ounces of derris powder with a rotenone content of four per cent.

For further protection against ticks, the government scientists advise clearing away undergrowth and keeping grass closely cut near houses, camps and other places frequented by humans.

Science News Letter, June 17, 1939

BIOLOGY

Electricity Exists Wherever There is Life, Scientists Find

If It Behaves in Living System as It Does Elsewhere The Electrical Field May Determine Nervous Structure

By DRS. H. S. BURR and PINCKNEY J. HARMAN, JR.
Yale University School of Medicine

(Electricity is the architect of the human body. Experiments by Drs. Burr and Harman, reported to the American Neurological Association, hold important implications in the understanding of health and disease in the human body, including perhaps even cancer.)

IT IS becoming increasingly clear that wherever there is life there is electricity. Apparently, a portion of the energy absorbed by a living thing from food and air and sun, is converted into electrical energy.

This energy is present in a relatively steady state just as in a battery there is a relatively steady voltage between the two poles of a battery. Some organs of the body, as for example, the heart and the brain, modify this direct current electricity to form an irregular alternating current which we recognize in the heart waves and in the brain waves. Studies of the direct current characteristic of the electricity found in living beings show that these are relatively stable but may be changed by fundamental biological activities such as menstruation, ovulation, cancer, growth, and wound healing.

However, it is well known that whenever electrical energy flows through a conductor, an electrical field can be found surrounding the conductor. Since electrical energy does flow through the living system, one should expect to find a field in that living system, unless electricity in living things is different from electricity in physical things.

May Play Major Role

If such a field can be demonstrated experimentally, it is by no manner of means impossible that it plays a major role in determining the pattern of organization in the living system. It has been possible to demonstrate the field experimentally by rotating a salamander on a revolving turntable under certain conditions. If this is done, the salamander produces a sine wave alternating current output analogous in every way, except in frequency and magnitude of output, to that of the ordinary electric dynamo. This suggests that voltage gradients in the nervous system may be responsible for the presence in the nervous system of a field which determines the location of nerve cells and the direction of growth in nerve fibers.

Voltage gradients in the nervous system of the white rat have been determined in some forty animals and show that the brain is positive to the spinal cord and to the peripheral nerve. The voltage rises as anesthesia deepens, and lessens as anesthesia lightens. In no case is there any reversal of polarity. When the animal dies the voltage drops slowly to zero, usually within an hour. However, the voltage between the spinal cord and the nerve may persist for several hours.

Infer Nervous System Field

Since these voltages in the nervous system are analogous to those found in the whole living animal, and since the whole animal possesses an electrical field, it is logical to infer that the nervous system also possesses a field and it may well be that this field determines the structural arrangement of the parts of the nervous system.

Science News Letter, June 17, 1939

ETHNOLOGY

Indians Use Airplane To Round up Wild Horses

USING an airplane to round up wild horses is just "horse sense" the way Yakima Indians of Washington State see it. They tried hiring a pursuit plane, piloted by a white man, last year and directed the pilot by flags planted on the ground, to head off the horses.

Delegates from the tribe, conferring with Indian Service officials, said they might try it again this year.

Science News Letter, June 17, 1939

Speedmeters have been devised which record the exact speed of every vehicle passing selected points on a highway.

PRESIDENT'S PALM

Close-up view of the top of the newly-named Rooseveltia frankliniana, giving a good idea of the size and beauty of its leaves.

ASTRONOMY

Gigantic Stellar Outburst Discovered in Distant Nebula

Is Only Nineteenth Supernova Ever Reported in Astronomical History; Can't Be Seen With Naked Eye

DISCOVERY of a gigantic celestial explosion, a supernova, or star that has flared in a far distant nebula to extraordinary brilliance, probably hundreds of thousands that of the sun, has been made by Dr. Fritz Zwicky while observing on Mt. Palomar, Calif., where the 200-inch telescope is being erected.

This newly-discovered outburst is located in the elliptical nebula known as NGC 4621, a member of the Virgo cluster. It is about 15th apparent magnitude, which means that it can be seen only with a powerful telescope. Identification of it as a supernova was made from a spectrum obtained at Mt. Wilson Observatory, and Dr. Walter S. Adams announced the discovery by communicating the information to Harvard College Observatory, clearing house for astronomical information.

This supernova is only the nineteenth reported in astronomical history. Dr. Zwicky has made a special search for supernovae and during the past few years has found several.

Famous among the rare supernovae of the past is Tycho's star, which appeared in November 1572 and was for some days visible in daylight and brighter than Venus at her best. Another temporary star, observed by Kepler in 1604, was as bright as Jupiter and remained visible for two years. These were much closer to the earth than the supernova just discovered by Dr. Zwicky and were therefore seen by the unaided eye.

More frequent are temporary or "new" stars giving out less light. These ordinary novae are not in the same class with the supernovae. But they attract much attention, both on the part of lay observers of the stars and the astronomers. Nova Herculis which burst forth shortly before Christmas 1934 was a spectacular ordinary nova.

Scientists speculate on what remains of novae when they fade away. One suggestion is that they become stars consisting of neutrons with no ordinary matter in their make-up. The neutron is one of the basic building blocks of matter and it was discovered in 1934. Such a spent star of neutrons would be extremely dense. The earth's mass on the same density would be a ball less than two miles in diameter.

The outburst of a nova transcends in magnitude all other known physical catastrophes. Astronomers do not know just what happens. Favorite among theories is that there is a tremendous release of energy within the atoms of matter composing the star. Another suggestion is that novae occur when two stars collide.

Science News Letter, June 17, 1939

BOTANY

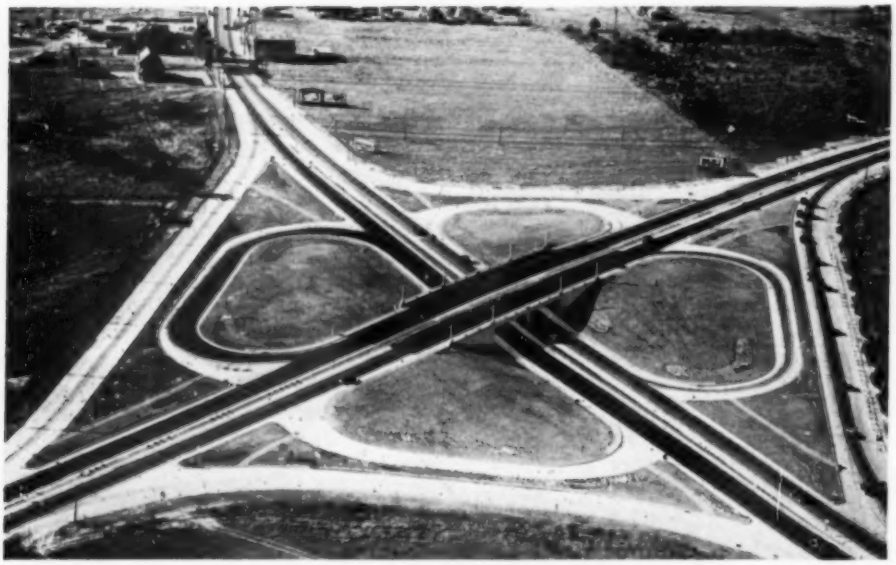
New Genus of Palm Named For President Roosevelt

A MAGNIFICENT tropical palm, symbolic at once of victory and peace, has been named in honor of President Roosevelt: *Rooseveltia frankliniana*. Specimens were collected on Cocos island in the Pacific during the President's last fishing cruise, by Dr. Waldo Schmitt of the Smithsonian Institution. The new genus and species were named by Dr. O. F. Cook, U. S. Department of Agriculture botanist.

President Roosevelt is not the first chief executive to have a genus of palm trees named after him. A fine type of fan palm, that grows in a chain of oases among California's desert mountains, bears the name *Washingtonia*. It is now widely cultivated as a park and street tree. There is also a *Jeffersonia*, a lovely spring wildflower, named in honor of Thomas Jefferson. Benjamin Franklin, whose surname is the President's given name, is memorialized by a beautiful magnolia-like Southern shrub, *Franklinia*, now extinct except in cultivation.

President Roosevelt's palm has had a curious history. Tiny Cocos island, where it grows in dense forests on the inland heights, is without permanent inhabitants. Early visitors to its shores thought that the inland palms were the same as the coconut trees that grew along the beach, and did not trouble to go inland for a closer look. One later scientist, Henry Pittier, recognized the tree as something distinct, but did not collect specimens or give it a name. It remained for Dr. Schmitt to bring out specimens, make exact notes and take photographs.

Science News Letter, June 17, 1939



TRAFFIC ENGINEER'S HANDIWORK

One of New Jersey's famous "clover-leaf" intersections, one of the ways in which the traffic engineer keeps traffic flowing swiftly, smoothly and safely. Intersections, as most of them are today, are ideal for the Grim Reaper and the traffic jam.

ENGINEERING

A New Profession—It Is Traffic Control Engineering

Millions of Motor Cars Have Created New Problems Of Safety and Movement; 500 Men Are Studying Them

See Front Cover

A NEW kind of professional man and scientific expert is coming into his own today in response to the needs of a nation on wheels.

He is the traffic engineer, most recent addition to the fraternity of professional technical men without whom the twentieth century as we know it would be an utter impossibility.

Five hundred of his kind are at work right now, thinking not so much about building roads or repairing them, but about a new job imposed by millions of motor cars: speeding traffic safely and sanely on its way. He and others are receiving their highly specialized training not only on the job, but in a number of special technical school courses, of which the most are offered by a 13-year-old institution first at Harvard and now at Yale, the Bureau for Street Traffic Research. More than 1500 of his fellows should be at work for city, state and Federal governments by 1950, in the opinion of Maxwell Halsey, associate director of the Bureau. But there will not be room for many more than that, it seems to Mr. Halsey, so do not rush to traffic school.

The traffic control engineer's concern is not with the structure of a road itself. It is with laying out the road so that traffic can move swiftly. It is with traffic signals, road markers and warning signs. He is concerned with intersections —New Jersey's famous clover-leaf intersections on main highways leading out of New York City are typical of the traffic engineer's work. He is also very much concerned with designing curves such that automobiles can move around them safely at the prevailing speeds on that particular road. Control of parking is a special headache that it is his job to salve or solve. Street and highway lighting are in his province.

His field is indeed a pioneering one because it has been subjected to special scrutiny for a relatively few years. One of his jobs is to find out more about the flow of traffic: what kinds of vehicles go where, when and at what speed? Such knowledge is indispensable to proper planning. How do the vast majority of accidents occur, and what percentages fall into the different categories of accidents? Such information is not yet being gathered on as wide a scale as topflight highway men would like.

Work for Governments

All but 50 of the 500 traffic engineers now at work are employed by the government, working either for the Federal government, the state governments or about 35 cities with formalized traffic control units as part of their municipal administrations. Your traffic engineer is no policeman; in a certain sense, his job is to tell the policeman what to do about regulating traffic. With about 30,000,000 vehicles using the streets and highways of the United States, the traffic problem is entirely too complex to be solved incidentally to the general exercise of police power.

Emergence of the traffic engineer is one of the marks of the fourth stage of auto transport's history, Mr. Halsey declares.

Before it was realized that keeping autos on the move is a separate profession in itself, America passed through a stage of rapidly mounting traffic and an appalling climb in the number of automobile accidents: from 10,723 in 1918 to 27,996 in 1928 to 38,000 in 1937. Only then did a large number of people begin to realize a fundamental truth which many far-sighted engineers and safety experts had been hammering home for years: America was driving millions of autos designed for comfortable travel at speeds of 60 miles an hour on highways whose basic characteristics go back to a slower age and which are safe for no more than 40 miles an hour. This at least was a partial explanation of many of the mishaps which were taking (and still do take) a fatality and casualty toll reminiscent of a war.

From the Surface Up

Until this time highway engineering was concerned almost exclusively with finding out where roads ought to go and with their construction from the surface of the road down. But this traffic problem indicated that specialized knowledge is needed to solve the problems above the surface of the road. The organization of government street and highway agencies reflected this condition, Mr. Halsey points out; though they had many men expert in building and in repairing highways, they had almost no specialists in controlling the way the roads were used.

Your traffic engineer is called upon to command many specialized forms of knowledge, all of which are now taught in one or more universities. His training requirements are shown in Mr. Halsey's breakdown of what the traffic engineer does with his time:

For 70 per cent. of his time, he tackles problems of mechanical control and parking, involving signs and regulations, marking, signals, islands and intersections, illumination and terminal facilities. For 10 per cent., he works on designing new roads and planning through traffic roads, oneway streets, zones and major street systems. For 5 per cent., he does traffic surveys, accident records, administration and the economics of the automobile. The rest of his time is devoted to problems of legislation, educating the public and enforcement.

Young men entering this new field should have an engineering degree before they take up the specialized traffic control work, Mr. Halsey thinks.

The illustration on the front cover of this week's SCIENCE NEWS LETTER shows an intersection in the city of tomorrow, as worked out in the General Motors' Futurama at the New York World's Fair. Pedestrians are on an entirely different level. Yes, there's a jaywalker in the picture on the auto level. He'll probably be arrested unless one of the autos gets him first.

Science News Letter, June 17, 1939

● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the U. S. Coast and Geodetic Survey resulted in the location of the following preliminary epicenter:

Thursday, June 8, 3:47.0 p. m., EST

In Samoan Islands southeast of Apia. Latitude, 15 degrees south. Longitude, 170 degrees west. Moderately strong.

Stations cooperating with Science Service in reporting earthquakes recorded on their seismographs are:

University of Alaska, College, Alaska; Apia Observatory, Apia, Western Samoa; University of California, Berkeley, Calif.; Dominion Observatory, Ottawa; Dominion Meteorological Observatory, Victoria, B. C.; The Franklin Institute, Philadelphia; Harvard University Observatory, Harvard, Mass.; University of Hawaii, Honolulu; Hong Kong Observatory, Hong Kong, China; Magnetic Observatory of the Carnegie Institution of Washington, Huancayo, Peru; Massachusetts Institute of Technology, East Machias, Maine; University of Michigan, Ann Arbor, Mich.; Montana School of Mines, Butte, Mont.; Montana State College, Bozeman, Mont.; Pennsylvania State College, State College, Pa.; Phu Lien Observatory, near Hanoi, French Indo-China; Seismological Observatory, Pasadena, Calif.; University of South Carolina, Columbia, S. C.; U. S. Weather Bureau, University of Chicago; University of Wisconsin, Madison, Wis.; Zikawei Observatory, near Shanghai, China; observatories of the Jesuit Seismological Association at Canisius College, Buffalo, N. Y., Fordham University, New York City; Georgetown University, Washington, D. C.; St. Louis University, St. Louis; St. Xavier College, Cincinnati, and Weston College, Weston, Mass.; observatories of the U. S. Coast and Geodetic Survey at San Juan, P. R., Sitka, Alaska, Tucson, Ariz., and Ukiah, Calif.

AERONAUTICS

Airport Lighting System Enables Landings on Bad Days

"Metered Light" With Powerful Lamp Can Be Seen Through Bad Weather, But Does Not Blind with Glare

A RADICALLY new airport lighting system, using controlled or "metered" light which enables a pilot, with proper radio approach aids, to land by ordinary visual contact almost regardless of the weather's thickness, is successfully passing tests at the Civil Aeronautics Authority's field experiment station at the Indianapolis airport.

Developed by a veteran airman turned lighting expert after years of listening to the plaints of old-time mail pilots sitting down under emergency conditions at his hometown airport, it provides a line of runway-marking and approach lights visible at least 500 feet ahead of the plane under all but the most phenomenal "ceiling zero, visibility zero" conditions. Once radio has taken the plane to the beginning of the guiding row of lamps, they are all the pilot needs.

Its introduction to airports throughout the United States, expected within the next year or two, should be a step whose importance is difficult to exaggerate, in the opinion of government air scientists. It brings nearer aviation's goal —all-weather airline service with railroad regularity. It provides an alternative to, and may be better than, the completely blind landing.

Its principle—controlled or "metered" light—is only beginning to be applied in other lighting fields.

Heart of the new system, John B. Bartow, the barnstormer and airplane sales agent turned inventor, explains, is a complicated lens which so controls the light emitted from a powerful lamp that the lamp looks just as bright to the on-course pilot whether he is 100 feet or 500 feet away. In other words, enough candlepower is provided to make the light visible at 500 feet under the thickest weather conditions, except of the most phenomenal sort. This powerful light is so controlled it does not become blinding as the pilot approaches through the fog. There is nothing unusual or new about the lamps; but without the lens system, they are utterly useless.

The system takes advantage of the changing angle between the moving plane and the lamps, which are located at each side of the runway and the approach. The lights face the approaching plane. The most light is transmitted through the center section of the lens, to show farthest along the plane's path; the least light is transmitted through the side of the lens which is in the pilot's line of sight as he nears and passes the lamp. The light is transmitted in vertical planes in analogous fashion to the vertical plane of radio range signals.

The lights are spaced about 200 feet apart. For a 4,000-foot runway and 2,000-foot approaches, as nearly typical of America's airline runways as one can guess, 80 lights in all are required. Four different colors are used: green to mark the approach sector, white the proper part of the runway and yellow the end of the runway, while the back sides of all lamps glow red to show the pilot he is heading in the wrong direction.

The lights have been tested quietly and without the benefit of any publicity since last January, when they were first placed in operation. Though they are strictly experimental and are therefore out beyond the end of one of the paved runways, they have been used on more than one occasion by airline pilots landing at Indianapolis under difficult conditions. They have met the pilots' acid test and were in fact the subject of comment by the men in the front seats when they were removed for some experimental changes. The pilots wanted them back immediately.

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Books

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AERONAUTICS

Scientists Devise Formula For Recovery From Spins

A SIMPLE formula which enables a designer to calculate in advance, within half an hour, whether his projected airplane will come out of a tail-spin safely and quickly has been developed by two scientists at the Langley Memorial Aeronautical Laboratory, the National Advisory Committee for Aeronautics, operators of the laboratory, announced.

If adopted by the aviation industry generally, it will simplify the task of building safer light airplanes, for tail-spins have figured prominently on the roll of accident causes among private flyers and, not so prominently, in other types of flying.

Responsible for the new formula, known as the "tail damping-power factor," are Oscar Seidman and Charles J. Donlan.

The chief requirement, in general, for an airplane that can be pulled out of a spin quickly is enough rudder that is not cut off from the air stream by the horizontal tail surfaces—in other words, enough rudder to give the pilot control at all times. In all but the flattest spins, the portion of the rudder above the horizontal tail surfaces is blocked off. Hence, the two N.A.C.A. men indicate, the need is to have a sufficient amount of rudder below the horizontal tail surfaces. Their formula shows how much is needed for an airplane of any given size or weight, with the exception of unconventional models, whose behavior cannot be so easily predicted in advance because they are unconventional.

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GENERAL SCIENCE

Science Called Upon To Justify Its Function

A HUNDRED or even 50 years ago to ask "What is the social function of science?" would have seemed "a strange, almost meaningless question even to the scientist himself, far more so to the administrator or the plain citizen." Prof. J. D. Bernal, brilliant young physicist of the University of London's Birkbeck College, writing in his *The Social Function of Science* (Macmillan) observes that there could then be no doubt that science's practical activities were the main basis of progress.

Now the picture is very different, he says, and the troubles of our times seem themselves to be a consequence of that very progress.

"The new methods of production which science has brought into being lead to unemployment and glut without serving to relieve the poverty and want which are as widespread in the world as ever before," Prof. Bernal writes. "At the same time, the weapons devised by the application of science have made warfare a far more immediate and more terrible risk, and have diminished almost to the vanishing point that personal security which was one of the chief triumphs of civilization.

"Of course, all these evils and disharmonies cannot be blamed exclusively on science, but there is no denying that they would not occur in their present form if it had not been for science, and for that reason the value of science to civilization has been and is being called into question."

This is what Prof. Bernal sets out to do with considerable thoroughness, assaying what science does and what it could do. Science itself seems in danger for the first time since the Renaissance, due to the disturbed state of the world and the universal preparations for a general and terrible world war. Prof. Bernal finds the whole sweep of science difficult to survey, reporting that no one knows how many scientists there are in any country, except perhaps in the U.S.S.R. What they are doing should be ascertainable from the 30,000 odd scientific periodicals published, but nowhere, says Prof. Bernal, is it possible to find how and why they do it.

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MEDICINE

Sulfanilamide Treatment Forestalls Mastoiditis

THE NEW DRUG, sulfanilamide, has extended its sphere of usefulness to cover otitis media, that extremely painful disease of the middle ear that often is the forerunner of a mastoid operation.

Eighty-eight patients with otitis media due to beta hemolytic streptococcus were given sulfanilamide in a recent series of cases and only seven required a mastoid operation, reports Dr. Gilbert E. Fisher of Baltimore. (*Journal, American Medical Association,* June 3)

In a control group of 95 patients who were given the regular treatment of puncturing the membrane for drainage and irrigation, 66 required a mastoid operation.

Moreover, the patients treated with sulfanilamide recovered in one-third the time taken by the other group.

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IN SCIENCE

ASTRONOMY

Astronomers Forecast Next Sunspot Cycle For 1944

THE next outburst of sunspots should occur early in 1944 and the next maximum of sunspots should come in the summer of 1948, it is forecast by Princeton University Observatory astronomers, Prof. John Q. Stewart and Forrest C. Eggleston.

Communicating their forecasts in a letter to the editor of the *Physical Review,* the Princeton scientists note that since 1749 A.D. sixteen sunspot cycles have been completed. The 17th outburst, they add, is not yet complete.

The next outburst, number 18, may be expected to commence roughly two-thirds of a year after the sunspot number has fallen to one tenth its maximum value. This places the date early in 1944.

The new forecast is made by fitting curves to the graphs made in plotting the number of sunspots monthly.

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ENGINEERING

With Cool Water Available Homes Can Be Conditioned

SUMMER cooling of homes by water from city water mains is feasible if the water temperature does not exceed 58 degrees Fahrenheit, according to findings of research scientists at the University of Illinois Engineering Experiment station.

The method is adaptable for homes having forced air heating systems. In the cooling technique pipes bearing cool water are placed within the air ducts and air forced over them.

When water temperatures are above 58 degrees Fahrenheit, so much water must be moved and pumped that it is cheaper to use mechanical refrigeration for the cooling, say the scientists.

Since water at 58 degrees is the limitation the method is not usually adaptable for homes south of a line passing through Missouri and Kentucky, state Profs. A. P. Kratz, M. K. Fahnestock, Seichi Konzo and E. L. Broderick who made the study.

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NCE FIELDS

PUBLIC HEALTH

Danger of Polio Epidemic This Summer Is Slight

AN INFANTILE paralysis outbreak this summer is very unlikely to occur, health authorities believe on the basis of reports to the U. S. Public Health Service for the season's critical week.

For the week ending June 3, reports of new cases in 27 states already heard from totaled only 18. If an epidemic were in sight, signs of it would be expected in the reports for that week.

Reports from Charleston, where there has been an outbreak of the crippling, paralyzing ailment, show a decrease. There were only three cases in the city and seven brought into the city hospital from the surrounding county.

Smallpox, in spite of the outbreak in Onondaga County Penitentiary, N. Y., shows signs of a decrease. With 20 cases from New York counted in, the total from 27 states was only 96 for the week ending June 3. Reports from Tennessee have not yet been received, however, and health authorities are somewhat concerned over what they will show, since there has been an outbreak of this disease in White County, Tenn., with about 150 cases reported so far.

The two smallpox outbreaks are unusual in occurring at this time because smallpox used to be considered a cold weather disease.

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ENGINEERING

British Escape Device Resembles U. S. Navy's Lung

BRITISH sailors rescued from the sunken submarine Thetis and six who escaped from the Poseidon seven years ago in the Yellow Sea off China's coast used a "lung" essentially similar in its design and operation to the U. S. Navy's "lung" which did not have to be used to save men from the Squalus.

Only the use of a mask fitting over the face and goggles over the eyes and the elimination of the nose clip distinguish the Davis lung, as the British device is known, from the Momsen lung. The Momsen lung is patented in England in the name of the three Navy men who developed it, Comdr. C. B. Momsen, O. B. Tibbals and Frank M. Hobson.

But the British have nothing equivalent to the diving bell that did yeoman work in the Squalus rescue, although its plans have been available to all comers ever since it was devised.

France, which likewise lacks the diving bell, has just taken steps to acquire it, it was reported also. Plans of the bell and detailed instructions in its use have been furnished the French naval attache. Equipment of foreign navies with the bell would require alterations of their submarines to provide hull fittings for its use. This will be a drydock job, although it would be neither long nor difficult in the case of most submarines.

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ASTRONOMY

New-Found Comet May Mean Meteor Shower Aug. 4

THE POSSIBILITY of a meteor shower in the early morning of Aug. 4, due to the earth coming within 3,000,000 miles of the orbit of the bright Comet 1939 d which was recently visible, is reported by Dr. V. Guth of the National Observatory at Prague. Particles moving in the same orbit as the comet but lagging behind it by 154 days might collide with the earth and show up as a "shooting star shower."

While a watch for meteors at that time will be kept by astronomers and amateurs throughout the world, a study made by Dr. Fletcher Watson of Harvard College Observatory indicates that the earth will not be likely to encounter a sufficient density of particles to provide a meteor shower. For one thing, on Aug. 4, when the earth reaches the vicinity of the comet's path, the comet will be twice as far on the other side of the sun as the earth is on its side of the sun. Experience shows that comets that cause intense meteor showers take relatively short times to make their journey around the sun and back to the earth's neighborhood. The period of this year's brightest comet is known to be long, probably greater than a hundred years and possibly thousands of years.

At first called the Hassel comet after the first discoverer to make known his observations, comet 1939 d is now known as the Jurlof - Achmarof - Hassel - Smith comet after four astronomers who spotted it almost simultaneously.

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ENTOMOLOGY

Fire Ants Destroy Quail; U. S. Aid Is Asked

GOVERNMENT entomologists have been called in to help save quail from serious menace by fire ants. Thousands of acres of land owned or leased for game preservation under the auspices of the Cooperative Quail Study Association in Florida, Alabama, Mississippi, Georgia and South Carolina are infested with these predacious ants that swarm into the quail nests as soon as the shells are pipped. The young birds are destroyed before they can get out of the shell and the mother quail is forced to start over, laying a new clutch of eggs, only to have the process repeated.

Since 1927, some circumstances of favorable environment, probably light rainfall, has caused such an increase in the numbers of fire ants, which do damage to citrus trees as well as to ground nesting birds, that a project has been initiated for the investigation of the problem by entomologists of the Federal government. According to Dr. Bernard V. Travis of the U. S. Bureau of Entomology and Plant Quarantine, the methods of underground migration peculiar to these ants make it extremely difficult to obtain accurate information about their behavior, necessary before effective control methods can be developed. Killing the mother queen ant, sodium cyanide soil fumigation, and poisoned baits have met with only partial success so far.

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GENETICS

Bureau of Human Heredity Established in England

A NEW organization for the study of the human race, the Bureau of Human Heredity, has been established in London (*Human Biology,* June). The bureau is directed by a council representing medical and scientific bodies in Great Britain.

Dr. R. Ruggles Gates, chairman of the council, writes that they will be grateful to receive "all available material from institutions and individuals, furnishing well-authenticated data on the transmission of human traits whatever these may be. . . . Material should be given with all available details in regard to source, diagnostic symptoms and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential."

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ARCHAEOLOGY

The Sphynx Tells All

It Develops That He Is No Lady, So He Has Revealed His Age and Dispelled Much of the Mystery About Him

By EMILY C. DAVIS

AFTER all these centuries of "telling nothing," Egypt's Great Sphynx has abandoned his line of mystery glamor, and is telling all.

We now know his age—his right age—and a good deal more of the inside story. Luckily he's no movie star and no lady, so there's little fear that the Sphynx of Giza will lose his charm for the public. The old stone face is still his fortune.

A modern Egyptian, Prof. Selim bey Hassan of the University of Cairo, is the man who has narrowed down the Sphynx's age to a very close date. Dr. Hassan, Egypt's best known archaeologist, is soon to publish the story of his two years' excavations at Giza around the Sphynx.

It turns out that Pharaoh Chephren engaged in some very complicated construction work at Giza cemetery, ending with the dramatic climax of creating the Sphynx.

Pharaoh Chephren had to play second fiddle to his brother Cheops in pyramid building. No other Pharaoh ever did break Cheops' record for sheer massive bulk in a tomb. But Chephren cleverly made his own pyramid look taller by placing it on high ground. Actually it was nine or ten feet shorter. Still, he gained a point of distinction; it looked taller. And then came the brilliant idea of the Sphynx!

New in 2700 B.C.

Prof. Hassan's conclusion that the Sphynx was the last part of Chephren's cemetery project means that the Sphynx was new and exciting for Egypt in the years shortly before 2700 B.C.

Chephren's reign is now usually said to have begun in 2766 B.C. Exactly how many years he reigned, however, is debated. As he built a very impressive pyramid and temples and the Sphynx after that, he can scarcely have started his Sphynx before 2750, and probably it made its appearance a few years later. That is close figuring on the age of so ancient a celebrity.

Sand around the Sphynx is still revealing clues to its experiences, and the people who have been drawn to visit it. A tablet inscribed with 31 ears—pictures of human ears—has been unearthed by Prof. Hassan in the sand north of the Sphynx court. He has found altogether nine representations of human ears near the Sphynx, and he has an answer to the question: Why did people carve ears and put them by the Sphynx?

Prof. Hassan thinks it likely that long ago religious-minded Egyptians used to make pilgrimage to the Sphynx, and there, standing before the awesome face, the pilgrim would dedicate an ear tablet to the god symbolized in the image. The god was remote and hard to reach. But the pilgrim could whisper his prayer into the carved ear in his own hand, and then tuck it away beside the temple or bury it in the sand. By magic transference, the god's own ear would hear and he would answer.

Carried Advertising

The tablet with 31 ears supports this interpretation of the ear mystery. The tablet bears a picture of a suppliant kneeling before the Sphynx and the inscription, "Hor-Em-Akhet, the great god, hears." Hor-Em-Akhet means Horus in the Horizon and was the name with which Egyptians addressed the sacred and symbolic image of the Sphynx.

A line of advertising on the ancient tablet speaks volumes regarding early business enterprise. It says: "Made by the clever scribe, Mer."

Pharaoh Chephren organized his huge cemetery project with considerable ingenuity, judging by the revelations of the sand.

First, it seems, he built his pyramid not far from that of his brother Cheops.

He followed tradition by building a temple close beside his pyramid. This would be used when the Pharaoh eventually took up residence in his pyramid house of the dead. Faithful, and doubtless well paid, servitors would bring food, drink, and clothing to this temple for the dead king.

Chephren also had to have a funerary temple nearer the village, where the people could pay him homage. The cemetery of Giza was on a desert plateau. In time it developed into a city of 1,500 noble and royal dead. The village of living Egyptians was below in the valley, and there the Pharaohs set "valley temples" for public worship.

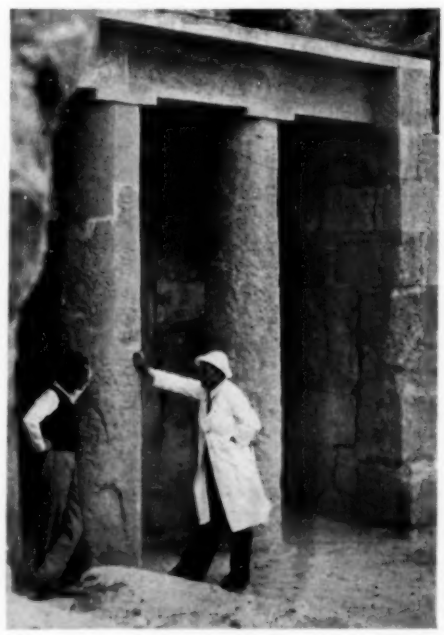
One thing led to another when a Pharaoh worked on his funerary plans. Chephren imagined crowds frequenting his temples, and he planned for the traffic problem.

Three Lane Road

The good road Pharaoh Chephren built to link his valley temple with his tomb-temple has been excavated by Prof. Hassan, who had to dig it out from under three to 45 feet of sand, rock, and debris. Its existence had been only vaguely recognized, as a sort of path.

The excavation has revealed to our generation—which can appreciate a novel traffic job—Pharaoh Chephren's three-way highway, 75 feet broad and stretching for more than half a mile from temple to temple. Center lane traffic was reserved for priests and processions. Sight-seers and ordinary worshippers kept to side lanes.

Pharaoh Chephren even ran a subway, or underpass, beneath his raised road at one point. It prevented congestion when



DIGGER

Prof. Hassan (right) at the entrance to a rock tomb in the cliffs that surround the Sphynx.

CAUSEWAY

Modern tourists boldly walk on Pharaoh Chephren's three-lane highway, from his Pyramid to his temple near the Sphynx. Original traffic rules reserved the middle lane for priestly officials only. A trench beside the raised road used to dump water into the amphitheater around the Sphynx.

traffic was headed for Cheops' part of the Giza cemetery and had to cross Chephren's road.

After all this, Chephren took up an esthetic problem—a huge hump of stone that certainly added nothing to the landscaping of his royal pyramid. His brother Cheops had left him this problem. When Cheops was alive and was seeking stone building blocks for his pyramid, his workmen got material at a huge quarry close by, but they avoided one inferior mass of alternate hard gray and soft yellow layers. Around it was the rough amphitheater dug out by the quarrying. It occurred to Pharaoh Chephren, or to some genius near him, that this lone problem rock would make a monument. So the rejected hump became the Sphynx.

Drainage a Clue

One reason why Prof. Hassan is sure that the Sphynx emerged after Chephren worked out the rest of his plans, is that a trench was cut alongside Chephren's raised highway to carry off rain water (there was more rain then) or drainage from temple sacrifices. This trench emptied into the amphitheater around the Sphynx. It would never have been allowed, had Chephren already ordered the Sphynx carved, for the image was royal and sacred.

The Great Sphynx is Pharaoh Chephren's portrait. Visitors still sometimes speak of it as a woman, but they are confusing the Egyptian Sphynx with the Greek Sphynx and her troublesome riddle about Man.

Egypt's Great Sphynx has a lion's body and symbolizes the king in his divine role as the sun god Ra. Egyptians linked the lion with their worship of a sun god.

Old Even Then

Chephren did not have to conjure up the fantastic man-beast as a new religious idea. Smaller sphynxes were old in Egypt, even in pyramid days. And more than 2,000 years after Chephren, Egyptians were still carving royalties in sphynx form. A whole avenue of sphynxes recently unearthed at Medinet Habu is recognized as a portrait gallery of the Ptolemy dynasty. But no one can identify Cleopatra nor any other Ptolemy in this religious guise. Egyptians did not emphasize good likenesses in their official and religious statuary. They had other standards of good art.

Prof. Hassan says that we know more about the Giza Sphynx than the man who designed it. He means that the mystery about its origin is dispelled, and in addition we know the extraordinary career that the Sphynx has had. Chephren never could have guessed what curious things would happen to his Sphynx.

Just for example:

The Sphynx was visited by tourists, beginning at least several centuries before Tutankhamen's reign. A sixteenth century B.C. sight-seer is the first on record at the Sphynx. The great stone face was then over a thousand years old.

Instructions in Dream

Sand had so blanketed the stone body by the time Thotmes IV ruled Egypt, shortly before 1400 B.C., that this Pharaoh undertook to clear it off. Tradition has said that he got instructions to do so in a dream, as a religious duty. Archaeologists have doubted that Thotmes had anything to do with the first renovating of the Sphynx. But then they found a tablet—Egypt's official record—stating that Thotmes IV did restore the Sphynx.

Accustomed as Egyptians were to sphynxes, they lost track of origins and people began to read queer, mysterious meanings into this biggest of sphynxes.

They said the image represented the god Hor-Em-Akhet, and they made pilgrimages to ask petitions.

An idea gained circulation that there was something inside the Sphynx—maybe a Pharaoh's treasure. Vandals dug holes, seeking a secret passage. One hole was dug in the head so big that a man can stand shoulder deep in it.

Arabs in the Middle Ages named the Sphynx the Father of Fear. The Turks fired cannon-balls at its face.

Napoleon's soldiers had the bright idea of remodeling the stone face to resemble their hero. They started chipping, but their work caused a bit of the Sphynx's ear to fall off with such a crash that it scared them away.

Pharaoh Chephren would doubtless be pleased with present efforts to appreciate his monumental masterpiece. In fact, the big cemetery city at Giza with its rows of nobility's tombs and its big and little pyramids of kings and queens, is revealing Egypt's distant Pyramid Age more clearly for the world to respect and wonder at. Prof. Hassan and Egyptologists of other countries have made many important finds there in recent years.

Oldest Mummy

In this cemetery, Prof. Hassan found the oldest Egyptian mummy yet discovered. The wife of one of Chephren's leading noblemen, who died while expecting motherhood, is this earliest of Egyptians—so far as we know now—to receive the elaborate attention of preserving the body which became an Egyptian specialty. Before finding this ancient and noble lady, archaeologists had supposed mummification a later de-

FOR PRAYER

Devout Egyptians, it is believed, would whisper their pleas to such a carved ear held in their hands and then would bury it beside the god's temple. By magic transference, the god's own ear would hear and he would answer.

velopment in Egypt. Now, they think it may have started even before Chephren's day.

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PUBLIC HEALTH

Federal Health Officials See No Danger of Smallpox

NO DANGER of a general spread of smallpox throughout the nation from the outbreaks in New York and Tennessee is foreseen by officials of the U. S. Public Health Service.

At the same time, they advise widespread vaccination against the disease.

Everyone who has not been vaccinated is susceptible to smallpox. Babies should be vaccinated before they are one year old, and children should be revaccinated before entering school. The immunity conferred by vaccination may last as long as 20 years, but often wears off in about five years. To be absolutely safe, therefore, one should be revaccinated every five years.

Each week throughout the nation more than double the number the New York and Tennessee outbreak cases occur, despite the fact that smallpox is the one disease for which medicine has a very sure preventive, vaccination. This is due to the fact that everyone does not get vaccinated.

As a matter of fact, health authorities are much more concerned over this continual week-after-week prevalence of smallpox than they are over any one or two specific outbreaks.

As a result of vaccination laxity, the United States stands third among leading nations in number of smallpox cases and deaths, being outstripped in this unenviable situation only by India and Mexico.

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MEDICINE

New Smallpox Vaccine Announced By Rockefeller

ON the heels of news of smallpox outbreaks in New York and Tennessee comes an announcement to scientists of a new smallpox vaccine which eliminates the severe scars and other inconvenient features of ordinary vaccination.

The new vaccine was developed by Drs. Thomas M. Rivers and R. D. Baird and S. M. Ward of the Hospital of the Rockefeller Institute for Medical Research. It is made by growing vaccine virus on a special medium consisting of minced chick embryo tissue and Tyrode's solution. Vaccinations against smallpox ordinarily are made with calf lymph vaccine virus.

Vaccination with the new vaccine virus should be followed, within six months to one year, by revaccination with calf lymph virus, the Rockefeller scientists advise in their report to the *Journal of Experimental Medicine*.

"In this way," they state, "vaccinated individuals will not become sick and will not be subjected to the dangers associated with primary vaccination with calf lymph virus, but will obtain a solid and lasting immunity to smallpox."

No scar forms after the primary vaccination with the new vaccine virus, it is reported, if the inoculation is properly made. Nor is there any fever and discomfort. Following revaccination later with calf lymph virus, very few of the children had fever or other symptoms, and what scars occurred were only "small superficial" ones.

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MEDICINE

Smallpox Outbreak Gives New Chemical Remedy Trial

SMALLPOX patients in New York are being treated with the new chemical remedy, sulfanilamide, it is learned from Dr. Edward S. Godfrey, State Health Commissioner.

The outbreak in Onondaga County Penitentiary is thus giving physicians a chance to learn whether this chemical remedy, which has saved lives threatened by childbed fever, erysipelas, pneumonia and many other ailments, will prove equally valuable in treating cases of the serious and disfiguring plague of smallpox.

Sulfanilamide hastened recovery and prevented scarring in four cases of smallpox, Dr. Walter O. McCammon, of Springfield, Ky., reported recently to the American Medical Association. This is a small number on which to base conclusions so medical scientists will doubtless welcome reports of other patients treated with the remedy in New York.

At present it is impossible, Dr. Godfrey says, to state the results of sulfanilamide treatment in the epidemic.

Vaccination for protection against smallpox is urged by health authorities.

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The British flag flies over about four million square miles of the Western Hemisphere.

BIOLOGY

Four Plant Sex Hormones Found in Low Form of Fungus

Two Arise in Female Plant and Other Two in Male; They Spread in Water, Bringing Response in Other Sex

FOUR different hormones, created and acting in sequence, control the preliminary sex functions in a newly discovered species of fungus water mold, a very primitive plant form, it has been shown by Dr. John R. Raper, Fellow of the Harvard Biological Laboratories.

Sex hormones have been studied for many years in human beings, animals, and higher plants, and there have been a few indications that such substances operated in low plant forms. But the activity of sex hormones in a plant have not been shown clearly and conclusively until Dr. Raper's work.

Two of the four hormones observed by Dr. Raper arise in the female plant, and initiate responses in the male plant; the other two hormones are produced by the male and initiate responses in the female. The hormones are known as "diffusion hormones," originating in plants of one sex and spreading through the water to plants of the other sex.

In his elaborate and delicately controlled tests, extending over two years, Dr. Raper determined that the hormonal activation and coordination of reproduction in the water mold is exercised as follows: hormone "A" arises from the female plant, is carried to the male plant through the water habitat, and induces the formation on the male plant of shoots, known as antheridial branches; hormone "B" arises from these new male branches, diffuses to the female plant, and gives rise there to small bulbs, known as oogonial initials, which afterwards contain the egg cells; hormone "C", arising from the female bulbs, attracts the male branches into contact; hormone "D" arises from the branches and delimits the female plant bulb.

Sterile When Separated

Reproduction of the water mold is rapid when male and female plants are placed in the same culture; but the plants are sterile when the sexes are separated.

Dr. Raper emphasized that his findings apply only to certain low forms of plant life, and perhaps not to other low forms or to higher more complex forms, such as flowers and trees. It may well be that the reproductive cycles of other low forms and the higher forms have entirely different controls from those observed in the water mold, he said.

His work provides ground for belief that at some points the functions of sex hormones in the water mold are quite similar to those in animal forms. It was shown that in the primitive water mold the hormone control of the reproductive cycle is extremely complex, as it is in higher animals.

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CHEMISTRY

Besides Food, Products of Farm Used 400 Ways

THE American city-dweller may have a picture of the American farmer as the man who raises the food stuffs of the nation but, with the advance of industrial research, the time-honored scene is no longer strictly true.

The U. S. Department of Agriculture has recently compiled a list of the non-food uses of American agricultural products whose publishing takes four pages in fine print in *Industrial and Engineering Chemistry*.

Even farmers may be surprised to learn that from 86 sources of agriculture there come 133 raw materials useful in other ways than food. And out of these raw materials are fashioned 240 different manufactured products. Finally the consumer—rural or city dweller—will be amazed to learn that there are more than 400 non-food uses for these products of the farm.

Cattle, of course, have food value as meat but most motorists may not know that cattle grease is a source of glycerol that may end up as anti-freeze for the family car. Or, just to vary the process, the glycerol may become part of the explosive dynamite.

Corn, in contrast, appears in our daily lives as the sizing on the backs of carpets, or as an adhesive, a rayon fiber, a tanning agent, a smoking pipe or as wall board.

Even such items as grapes have non-food uses for the grape seeds yield an oil that appears in lubricants and in soaps.

Trees, of course, have a major value as lumber but omitting this item, they and their products do the following things: Make possible book and newsprint paper. Help tan leather. Create fiberboard. Act as an adhesive for lenses. Smoke meats. Yield valuable chemicals like acetone and acetic acid. Furnish dyes and create valuable plastics.

Even the bees have a role. They furnish beeswax which appears in the form of polishes, candles, cosmetics and is used in the lithography which makes today's brilliantly colored advertising pictures.

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ARCHAEOLOGY

Science Can't Agree Over Medieval Norse Mystery

ONE of the strange mysteries of the Middle Ages began to unfold when Eric the Red planted a Norse colony in Greenland in 986.

For several centuries the venture flourished. Bishops and churches, republican government, farmsteads, all bespoke the solidarity of the pioneer settlements among Greenland Eskimos.

Then came adversity, and 9,000 Norsemen vanished, no one knows when or why.

Scientists still hope to solve the mystery by aid of excavations and documentary studies. Settlements in both west and east Greenland have been explored. Recent discoveries in western settlements revealed farms, church, a forge, and nearly 1,200 objects used by the colonists. In the graveyard, later burials intruded on older ones, suggesting haste and emergency.

The most oft-repeated explanation of what happened is that the colonists eventually lost touch with the homeland, became malnourished on Eskimo food, caught the Black Death raging in Europe, and succumbed to their troubles, which also included violent Eskimo attacks.

But another solution has it that Eskimos did not wipe out the white settlers, but absorbed the remnant by marriage; and that descendants of the ill-fated colony are among the fairer Eskimos of Greenland today.

Arctic explorer Vilhjalmur Stefansson dissects the arguments in his *Unsolved Mysteries of the Arctic*, and declares: "The question of whether the European colony disappeared by extermination or amalgamation threatens to become an

absurdly nationalistic issue. For most Danes favor the extermination theory, and most Norwegians the one of amalgamation.

Stefansson provides good ammunition for the amalgamation theory: A plague would have weakened Eskimos as well as beleaguered Norse. Malnutrition would hardly have beset Norsemen who fell back on the same meat diet on which Eskimos throve; but on the contrary a mixed diet of imported food and meat handled in European manner might have diet deficiencies. And certain observers who reported the Norse extinct may have misunderstood what they saw.

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MEDICINE

Lack of Vitamin C May Be a Cause of Food Allergy

LACK of the scurvy-preventing vitamin C from citrus and other fruits and fresh vegetables may be one cause of food allergy, Drs. J. Bronfenbrenner, D. M. Hetler, Frances Love and Jack M. Burnett of St. Louis announced.

People with food allergy are the "one man's meat is another man's poison" folks. Eating tiny amounts of certain foods, most often eggs, milk or wheat, gives these patients severe attacks of asthma, hives, migraine headaches or other allergic ailments. Treatment with ascorbic acid, as vitamin C is now called, may enable these people to eat the foods to which they are sensitive.

Guinea pigs furnish the evidence for this theory. Pigs made sensitive to egg white could eat this food when they were given the vitamin. When the vitamin was removed from their diet, practically 100 per cent. of the animals developed allergic symptoms when fed egg white. If enough vitamin was given to these animals over a period of weeks, they could eat the egg white, although hypodermic injections of it showed they were still sensitive to the substance.

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MEDICINE

Kidney, Heart and Artery Ailments Analyzed

EVERY other person in the United States past 50 years of age dies of diseases of heart, blood vessels and kidneys. That statement and an analysis of the problem was presented by Drs. F. W. Konzelman, Lawrence W. Smith, Edw. Weiss, Walter I. Lillie and Edwin S. Gault of Philadelphia at the recent meeting of the American Society of Clinical Pathologists.

Since the average age of the population is getting older, more and more people are reaching the period at which these degenerative diseases take their toll.

The cardiovascular renal diseases, as listed by the Philadelphia physicians, are: 1. high blood pressure, without previous kidney disease, resulting in diffuse hardening of the arteries; 2. atherosclerosis, a special kind of hardening of the arteries which is a senile degenerative process affecting the large blood vessels and their branches; 3. the kidney ailment, glomerulonephritis, in which the kidney disease is primary and the high blood pressure secondary; and 4. a combination of these conditions, especially of the first and second.

With this as a background, the Philadelphia doctors list the main causes of death from cardiovascular renal diseases after age 45 as follows: 1. heart failure and hardening and blockage of the heart's arteries accounts for 50 per cent.; 2. hemorrhage, blockage or other accidents to the blood vessels of the brain, familiar to the layman as apoplexy and "stroke," accounts for from 30 per cent to 40 per cent.; 3. kidney failure with uremia accounts for 10 per cent.

In childhood, adolescence and early adult life, rheumatic fever, syphilis and other infections are chiefly responsible for the damage to heart, blood vessels and kidneys. In middle life syphilis is the chief villain. In older life it is the degenerative diseases which weaken the structure and impair the functions of the vital organs.

About half of all those over 50 years who die of cardio-vascular renal diseases have had high blood pressure. One-half of all women who have toxemia of pregnancy will within five years develop high blood pressure or chronic kidney disease. The younger the person who develops heart, blood vessel and kidney ailments, and the higher the diastolic blood pressure, the less favorable is the prognosis.

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never before been recognized as a cause of human illness, although it has been found in other animals.

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Study Brain in Operation

BRAIN wave studies can now be taken directly from the patient's brain as it lies exposed on the operating table. A method of doing this under aseptic conditions and the results of such studies were reported by Drs. Ernest Sachs, Henry G. Schwartz and Alan S. Kerr of St. Louis.

Brain tumors, tumors of the pituitary gland, hydrocephalus (water on the brain) and Meniere's disease were the conditions studied with this new technic. Tumor tissue itself is not electrically active, the St. Louis doctors reported. Characteristic waves of high amplitude and slow frequency were found in tissue overlying or adjacent to a tumor. More marked activity was noted in the record from tissue overlying a cerebellar tumor than from a similar area of the brain in a patient with Meniere's disease. In one case of hydrocephalus, no electrical activity could be discovered until after release of the fluid in the ventricles.

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Although a cow "mows" with mouth only three inches wide, she can gather in 150 pounds of herbage in a good day.

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WILDLIFE

NATURE RAMBLINGS

by Frank Thone

Weed-Fed Ducks

BEEF and pork are usually advertised as corn-fed, veal and chicken as milk-fed; wild duck, by the same token, should be touted as weed-fed. For plants that most of us would instantly classify as weeds are the dietary staples of most of the good wild ducks of the United States and Canada, it appears from two new publications of the U. S. Biological Survey, written by Dr. Clarence Cottam, A. C. Martin and F. M. Uhler.

Some of the outstanding duck foods which they list are frankly and professedly weeds. Most widespread and most generally eaten is the pondweed; mermaid weed, pickerelweed, smartweed and duckweed also figure in the wildfowl diet of weeds.

Some food items, like wild rice, wild millet and wild celery, are named for resemblances, real or imaginary, to the corresponding items in the cultivated fields of the uplands, yet it is by no means certain that to the casual eye these would appear as anything but just more weeds. Only a few, like waterlily and arrowleaf, can claim classification as flowers.

There are weeds even among weeds, the study shows. That is, there are certain plants that produce little or no food for ducks and that crowd out other plants which the broadbills really like. Just as some of our worst field weeds are undesirable aliens, so also it is in the ponds and swamps. Two of the worst "crowder-outers" are the water hyacinth, from Africa, and the water chestnut, an Asiatic pest.

Nevertheless, most of the troublemakers are native species, including many kinds of sedges, grasses and bulrushes. Many persons will doubtless hear with concern that cattails, old childhood favorite, are not good friends of ducks, and that one of the most beautiful of our native flowers, the American lotus, is a weed, from the ducks' point of view.

There is even machinery, for crushing out the mere spacegrabbers and giving the food-yielding "weeds" a chance to do their stuff for the ducks.

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PHYSICS

Old Violins Studied To Learn Their Secret

MUSICIANS will tell you that there have never been violins made equal to those of the old masters such as Stradivarius and Guarnerius. These are the kinds of instruments which sell for $20,000 and more.

Why will anyone pay that price for an instrument? Surely not because it is an exquisite example of wood carving or a genuine antique. A more reasonable reason is that the old instruments really give a more beautiful tone.

Just why the world's prized violins do this is a matter which scientists have been studying for years and will continue to do so for some time to come. In a way they are racing against time for within two centuries these old instruments, now almost priceless in their tonal qualities, will become decrepit instruments valuable only for museum cases.

Dr. F. A. Saunders of Harvard University reports that from his studies of superior violins, owned by such musicians as Jascha Heifetz, it is found that the body of the violin acts as an amplifier for the sounds generated in the strings. The violin body is a loudspeaker, but not a perfect one and not as good as those used in the better radio sets today.

Blindfold tests show that only expert violinists can tell the difference in tone between famous old instruments and good modern copies of them. More of these studies need to be undertaken, Dr. Saunders maintains, to see whether the extreme high prices of old instruments really mean anything to the average audience. Scientists strongly suspect that their slight superior qualities are largely wasted in public performances.

It is believed that the aging of wood in an old violin, rather than the wood carving ability, may account for the superior tones. If this is true the goal of modern men would be to age wood artificially in the proper way and thus create excellent modern instruments.

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ARCHAEOLOGY

Iran May Prove Oldest Center of City Life

WHERE was the world's first city? Archaeologists have been seeking an answer to that question ever since they began digging into buried ruins and finding to their surprise how ancient city "advantages" really are.

For a while, Egypt and Mesopotamia were the only serious rivals for honor of being first in city life. Now, however, Syria, India, and Iran are mentioned as "dark horse" candidates. To prove earliest, one of these regions must reveal convincing evidence of city life earlier than 4000 B. C.

The site now popularly termed the world's oldest city is Tepe Gawra, in Mesopotamia, where American expeditions have carefully probed 26 layers of ruins. Tepe Gawra around 4000 B. C., or even earlier, had to its cultural credit well-designed public buildings and fortifications, art, music, religion, social life, personal adornment. With such progress manifested, the dawn of city life must be sought still earlier in less pretentious form.

French archaeologists regard Syria as a region of cradle cities as far back as 4000 B. C. or perhaps 5000 B. C. There are signs that India may have earlier cities than the now-famous ones of around 3000 B. C.

As for Iran—two geologists, Lester S. Thompson and Henry Hotchkiss, have examined elaborate irrigation systems and a Great Wall and moat in northeastern Iran. In a report to the American Institute for Iranian Art and Archaeology, they declare that these public works show "a very high degree of engineering skill and clearly indicate the existence of a strong, well organized central government."

Who the ancient builders were is still not known. But by geologic evidence, Mr. Thompson places their handiwork as probably not later than 4000 B. C. and possibly as long ago as 8000 B. C. Their cities, if they had cities to defend, are yet to be unearthed.

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Mineralogy

GEMS AND GEM MATERIALS—Edward Henry Kraus and Chester Baker Slawson—*McGraw-Hill,* 287 p., illus., $3.50. Where gems are found, what they are, how they are cut and polished, and a great deal of other information on this ever-fascinating subject. There are four colored plates.

Science News Letter, June 17, 1939

Ethnology

THE SHEPHERD OF ALL: THE TWENTY-THIRD PSALM—Interpretations by George M. Lamsa—*A. J. Holman Co.,* 86 p., 50c. See SNL May 27.

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Engineering

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1939, Vol. 17.— *American Society of Heating and Ventilating Engineers*—1248 p., $5, thumb indexed copy $5.50. The newest technical information in an important industrial field.

Science News Letter, June 17, 1939

Plant Physiology

PROTEIN METABOLISM IN THE PLANT—Albert Charles Chibnall — *Yale Univ. Press,* 306 p., $4. This book appeals to a limited audience—chemical plant physiologists—but its appeal to that audience is exceedingly strong, especially since nothing of the kind has hitherto been available in single-volume form.

Science News Letter, June 17, 1939

Physics

INTRODUCTORY COLLEGE PHYSICS—Oswald Blackwood—*Wiley,* 487 p., $3.50. A text from the University of Pittsburgh for the general student with little previous scientific training. Familiar examples of the application of physics in the modern world keep the subject vivid.

Science News Letter, June 17, 1939

Wildlife

FOOD OF GAME DUCKS IN THE UNITED STATES AND CANADA—A. C. Martin and F. M. Uhler—*Gov't. Print. Off.,* 156 p., 40 c; FOOD HABITS OF NORTH AMERICAN DIVING DUCKS — Clarence Cottam — *Gov't. Print. Off.,* 140 p., 30 c. See page 383.

Science News Letter, June 17, 1939

Conservation

CONSERVATION IN THE UNITED STATES —A. F. Gustafson, H. Ries, C. H. Guise and W. J. Hamilton, Jr.—*Comstock,* 445 p., $3. Excellent either as a text for college classes or for a convenient reference, this book offers its information in four main sections: soil and water; forests, parks and grazing lands; wildlife; minerals. The authors are members of the faculty at Cornell University, long a stronghold of the conservation movement.

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Anatomy

TEXTBOOK OF NEURO-ANATOMY AND THE SENSE ORGANS—O. Larsell—*Appleton-Century,* 343 p., $6. A text for first year medical students written by the professor of anatomy at the University of Oregon Medical School.

Science News Letter, June 17, 1939

Radio

LOCAL BROADCASTS TO SCHOOLS—Irvin Stewart, ed.—*Univ. of Chicago Press,* 239 p., $2. A study of practices and methods in six American cities which have used radio in their schools. This is a project of the Committee on Scientific Aids to Learning.

Science News Letter, June 17, 1939

Entomology

RÉSULTATS SCIENTIFIQUES DU VOYAGE AUX INDES ORIENTALES NEÉRLANDAISES DE LL.AA.RR. LE PRINCE ET LA PRINCESS LÉOPOLD DE BELGIQUE. Vol. III, Fasc. 19: Araneae—C. Fr. Roewer—*Musée Royal d'Histoire Naturelle de Belgique.*

Science News Letter, June 17, 1939

Hobbies

SILK SCREEN STENCIL CRAFT AS A HOBBY—J. I. Biegeleisen—*Harper,* 139 p., $2. An interesting and fairly simple method of making your own greeting cards, or decorating almost anything. A stencil of the design is drawn on a silk or organdy "screen", which is stretched on a wooden frame. Colors are then forced through the stencil onto the article to be decorated.

Science News Letter, June 17, 1939

Biology

EVOLUTION: Essays on Aspects of Evolutionary Biology Presented to E. S. Goodrich—G. R. de Beer, ed.—*Oxford,* $5. A *Festschrift* volume presented by colleagues to Prof. E. S. Goodrich of Oxford University on the occasion of his seventieth birthday. Some highly stimulative and informative material is to be found in its pages.

Science News Letter, June 17, 1939

Botany

PLANT BIOLOGY—H. Godwin—*Cambridge (Macmillan),* 308 p., $2.25. A British textbook, in which the functional point of view is given the lead.

Science News Letter, June 17, 1939

Botany

SOME EDIBLE MUSHROOMS—Nina Lane Faubion—*Binfords & Mort,* 127 p., illus., $1.35. A handy, pocket-sized book, giving essential information about the commoner mushrooms in plain English, with line drawings, and in the back, some directions for cooking.

Science News Letter, June 17, 1939

General Science

THE SOCIAL FUNCTION OF SCIENCE—J. D. Bernal—*Macmillan,* 482 p., $3.50. See page 376.

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General Science

THE CHILD'S STORY OF SCIENCE—Ramon Peyton Coffman—*Putnam,* 246 p., $2.50. "Uncle Ray" tells in simple (but not over-simple) language the story of all the sciences, from astronomy and the origin of the earth to the intimate things of here and now. The illustrations are all well-executed line drawings.

Science News Letter, June 17, 1939

Embryology

FORM AND CAUSALITY IN EARLY DEVELOPMENT — A. M. Dalcq — *Cambridge (Macmillan),* 197 p., $3.50. Recent results of experimental embryology, sometimes illuminating, sometimes baffling, are the subject of this book. A masterly job has been done in digesting the enormous mass of published material and presenting the most significant ideas in such brief form.

Science News Letter, June 17, 1939

Physiology

L'ACTIVITÉ E'LECTRIQUE DE L'E'CORCE CÉRÉBRALE — Frédéric Bremer — *Hermann et Cie,* 46 p., 15 fr.

Science News Letter, June 17, 1939

Engineering

HIGHWAY RESEARCH BOARD, Proceedings of the Eighteenth Annual Meeting —Roy W. Crum, ed. — *National Research Council,* 405 p., $2.25.

Science News Letter, June 17, 1939

Botany—Zoology

A NEW PALM FROM COCOS ISLAND COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—O. F. Cook, 26 p., 26 pl., 40 c.; FLOWERING PLANTS COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938 — Ellsworth P. Killip, 4 p., 5 c.; ECHINODERMS (OTHER THAN HOLOTHURIANS) COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—Austin H. Clark, 18 p., 5 pl., 15 c; TWO NEW GOBIOID FISHES COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—Isaac Ginsburg, 5 p., 5 c—*Smithsonian Institution.* See p. 373.

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